REPORT DOCUMENTATION PAGE

WR-017-94

Form Approved
OMB No. 0704-0188

AD-A279 023

1. AGENCY USE

3. REPORT TYPE AND DATES COVERED

4. TITLE AND SU

Intestinal Parasitism in an Owl Monkey

5. FUNDING NUMBERS

6. AUTHOR(S)

Dale G. Dunn

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Walter Reed Army Institute of Research

Washington, DC 20307-5100

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

U.S. Army Medical Research & Development Command
Ft. Detrick, Frederick, MD 21702-5012

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

APPROVED FOR PUBLIC RESEASE:
distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT (*Maximum 200 words*)

Case report, no abstract.

14. SUBJECT TERMS

Owl Monkey, Aotus, Intestinal Parasitism, Phaneropsolus

15. NUMBER OF PAGES

2

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT

Laboratory Animal Science

Vol 43, No 6
December 1993

Diagnostic Exercise: Intestinal Parasitism in an Owl Monkey

Dale G. Dunn

History

Sections of a small metazoan parasite were observed during routine histopathological examination of the duodenum of a 6-year-old, wild-caught, female, owl monkey *(Aotus nancymai)*. Twelve minute organisms were recovered from the fixed specimen of duodenum and identified subsequently by a parasitologist. The animal originated in Peru and had been housed in a research colony in the United States for 5 years. Clinical illness was not observed prior to the animal's euthanasia as part of a research protocol.

Pathology

Parasites were barely visible to the naked eye and were firmly attached to the duodenal mucosa upon gross examination. Organisms were pyriform to oval and 650 µm x 800 µm at greatest width and length, respectively, when examined under a coverslip in saline (Figure 1A). Histologically, the parasites were deep within and expanded the intestinal glands (Figures 1B, 1C). Morphologic features of the organism included an oral and ventral sucker, thin spiny cuticle, parenchymatous matrix, intestinal tract, vitellaria, testes, prostate gland, and uterus. Uteri were filled with oval, thick shelled, refractile, operculated eggs measuring an average of 18 µm x 32 µm (Figure 1D). Low numbers of lymphocytes and plasma cells were scattered throughout the lamina propria adjacent to some of the parasites.

Questions

What is the parasite's identity and life cycle? Is there a potential public health concern?

Diagnosis and Discussion

Based on morphologic and histologic features, this parasite was identified as the lecithodendriid trematode, *Phaneropsolus orbicularis*. Reports of trematodiasis in owl monkeys are rare. Two dicrocoeliid trematodes, *Athesmia heterolecithodes* and *Zonorchis goliath*, are known to parasitize *Aotus* sp., however, these are found in the bile duct and are considerably larger (1.5 to 2.0 mm x 8.0 to 9.0 mm and 2.5 to 3.7 mm x 9.5 to 13.0 mm, respectively) than *P. orbicularis* (1).

From the Division of Pathology, Walter Reed Army Institute of Research, Washington D.C. 20307-5100.

Species of the genus *Phaneropsolus* Looss, 1899, are intestinal parasites of mammals, birds, and reptiles (2), primarily of tropical regions of North America, South America, Africa, and Asia. Thirteen species have been collected from mammals, two of which, *P. bonnei* and *P. spinicirrus*, are reported human parasites in Indonesia and Thailand (3). *P. bonnei* also has been recovered from crab-eating macaques *(M. iris, M. fascicularis)*, and slow loris *(Nycticebus coucang)* from Malaysia, and rhesus monkeys *(M. mulatta)* from India (4). Reported hosts of *P. orbicularis* include the white-faced sapajou *(Cebus capucinus)*, squirrel monkey *(Saimiri sciureus)*, long-tusked marmoset or tamarin (*Saguinus* sp.), and night monkey (*Aotus* sp.) (5).

Flukes of veterinary importance are primarily digeneans (6). The order Digenea is so called because its members develop indirectly with sexual and asexual generations parasitizing alternate hosts (6). The digenean life cycle is complex and has many variations, each involving at least two hosts: a mollusk, usually a snail, in which asexual multiplication occurs, and a vertebrate, in which the adult worm develops (5, 6). Flukes are discriminating in the choice of a snail intermediate host (6). The complex life cycle and specificity for snail intermediate hosts serve to limit the geographic range of specific trematodes and make infection of laboratory or commercially reared animals rare (5).

The life cycle of *Phaneropsolus* is not completely known; however, it is presumed to be similar to that of other Digenea. Although the snail intermediate host for *P. bonnei* has not been identified, insects of the order Odonata have been shown to be second intermediate hosts (7). This complex life cycle requiring multiple intermediate hosts effectively eliminates any public health risk in the research environment.

When trematodiasis is found in the laboratory setting, it usually involves animals that have been brought in from their natural environment. Alternatively, laboratory cases may involve animals fed food contaminated with the encysted metacercaria produced by some species of trematode (5). The absence of reported cases of *Phaneropsolus* infection occurring naturally in any species indigenous to the United States suggests that the parasite may not occur in this area. Due to the complexity of the digenean life cycle and specificity for intermediate hosts, the infection in this case must have been acquired in the wild. Little is known about the life span of trematodes in their vertebrate host. Interestingly,

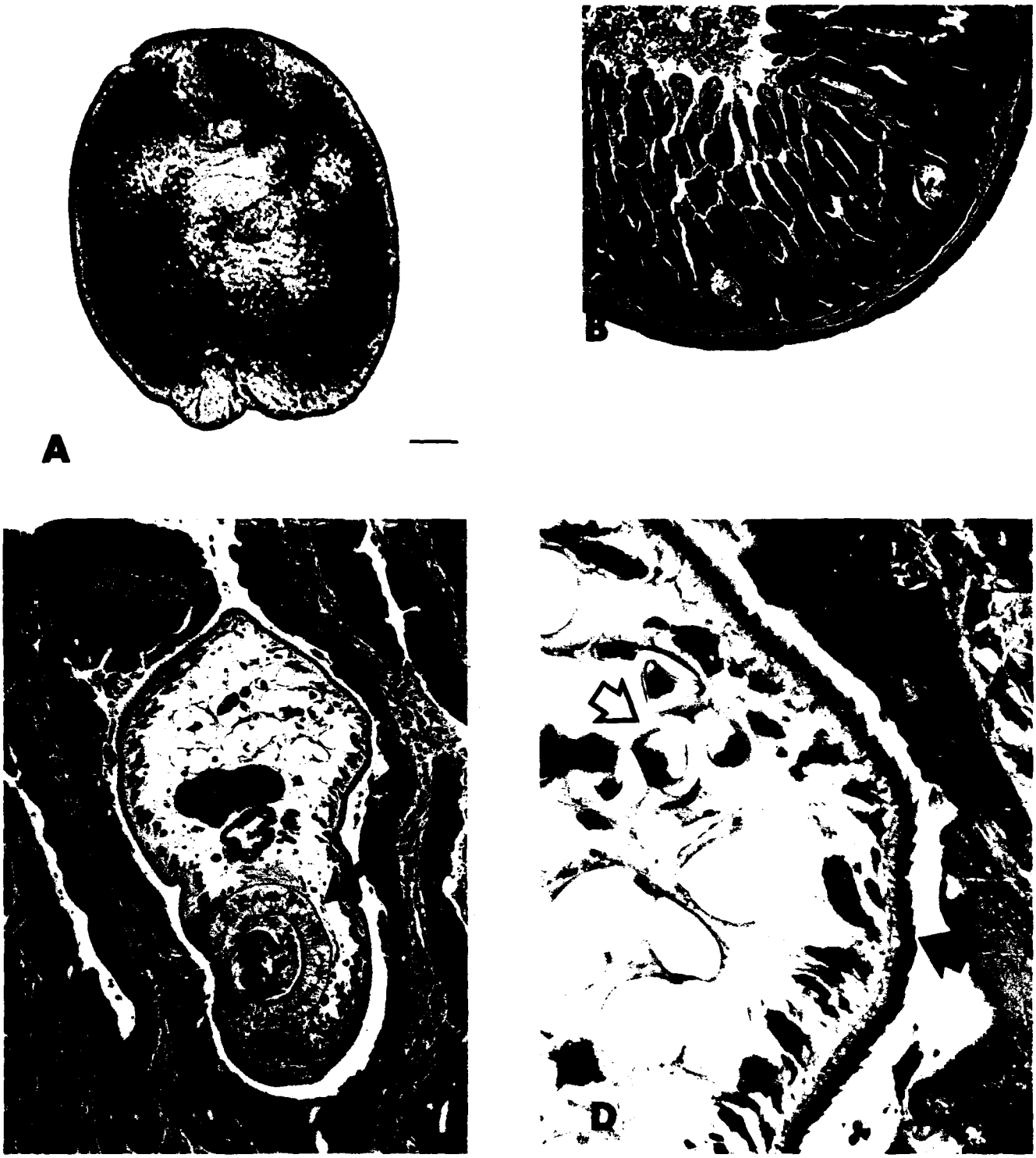

Figure 1. **(A)** An adult *Phaneropsolus orbicularis*, recovered from the formalin fixed duodenum of an owl monkey, as viewed under a coverslip in saline. The dark lateral fields denote the egg-filled uterus. H & E. Bar = 100 µm. **(B)** Subgross view of the duodenum. Note the two adult trematodes deep in the intestinal glands (arrows). H & E. Bar = 0.5 mm. **(C)** Adult *P. orbicularis* with oral sucker containing fragments of intestinal mucosa (arrow). H & E. Bar = 62 µm. **(D)** Higher magnification demonstrating a thin spiny cuticle (solid arrow) and typical thick-shelled refractile eggs (open arrow). H&E. Bar = 35 µm.

the length of time this monkey spent in captivity would suggest that adult *Phaneropsolus* sp. may live for up to 5 years.

There were no significant pathological changes attributable to the parasites in this case. While this could indicate a long-standing host-parasite relationship in which the two species are well adapted to each other, not enough is known or written about *Phaneropsolus* in nonhuman primates to make such a claim. Our limited knowledge of *Phaneropsolus* infection may be ascribable to its diminutive size. The organisms may be overlooked during gross pathologic and fecal examinations, and thus, the paucity of reports in the literature may not reflect the true incidence of *Phaneropsolus* infection in owl monkeys or other nonhuman primates. A more rigorous assessment of the incidence of parasitism in host species will reveal the significance of this parasite in the nonhuman primate.

Acknowledgements

Special thanks to Dr. Bill Font, Southeastern Louisiana University, Hammond, LA, and Dr. Jeffrey Lotz, Gulf Coast Research Lab, Ocean Springs, MS, for confirming the identity of the parasite.

Financial support for this series is provided by Harlan Sprague Dawley, Inc. and presented by the Registry of Comparative Pathology, which is supported in part by grant RR00301 from the National Center for Research Resources, National Institutes of Health, Bethesda, MD, under the auspices of Universities Associated for Research and Education in Pathology. Sponsors of this series are not associated with the cases described.

Contributions of manuscripts for this series are welcome and should be submitted to the editor.

Reprint requests should be addressed to the author.

References

1. **Kuntz, R. E.** 1972. Trematodes of the intestinal tract and biliary passages, p. 104–123. *In* R. N. T-W-Fiennes (ed.), Pathology of Simian primates, Part II: Infectious and parasitic diseases. S. Karger, Basel.
2. **Yamaguti, S.** 1971. Synopsis of digenetic trematodes of vertebrates, vols. I, II, p. 1074. Keigaku Publishing Co., Tokyo.
3. **Kaewkes, S., D. B. Elkins, M. R. Haswell-Elkins, *et al.*** 1991. *Phaneropsolus spinicirrus* n. sp. (Digenea:Lecithodendriidae), a human parasite in Thailand. J. Parasitol. **77**: 514–516.
4. **Lie, K. J.** 1962. *Phaneropsolus bonnei*, a trematode found in man in Indonesia occurring in monkeys. Med. J. Malaysia **17**:83.
5. **Flynn, R. J.** 1973. Parasites of laboratory animals, p. 120–154. Iowa State University Press, Ames, Iowa.
6. **Georgi, J. R., and M. E. Georgi.** 1990. Parasitology for veterinarians, p. 103–117. W. B. Saunders Co., Philadelphia.
7. **Manning, G. S., and P. Lertprasert.** 1973. Studies on the life cycle of *Phaneropsolus bonnei* and *Prosthodendrium molenkampi* in Thailand. Ann. Trop. Med. Parasitol. **67**:361–365.